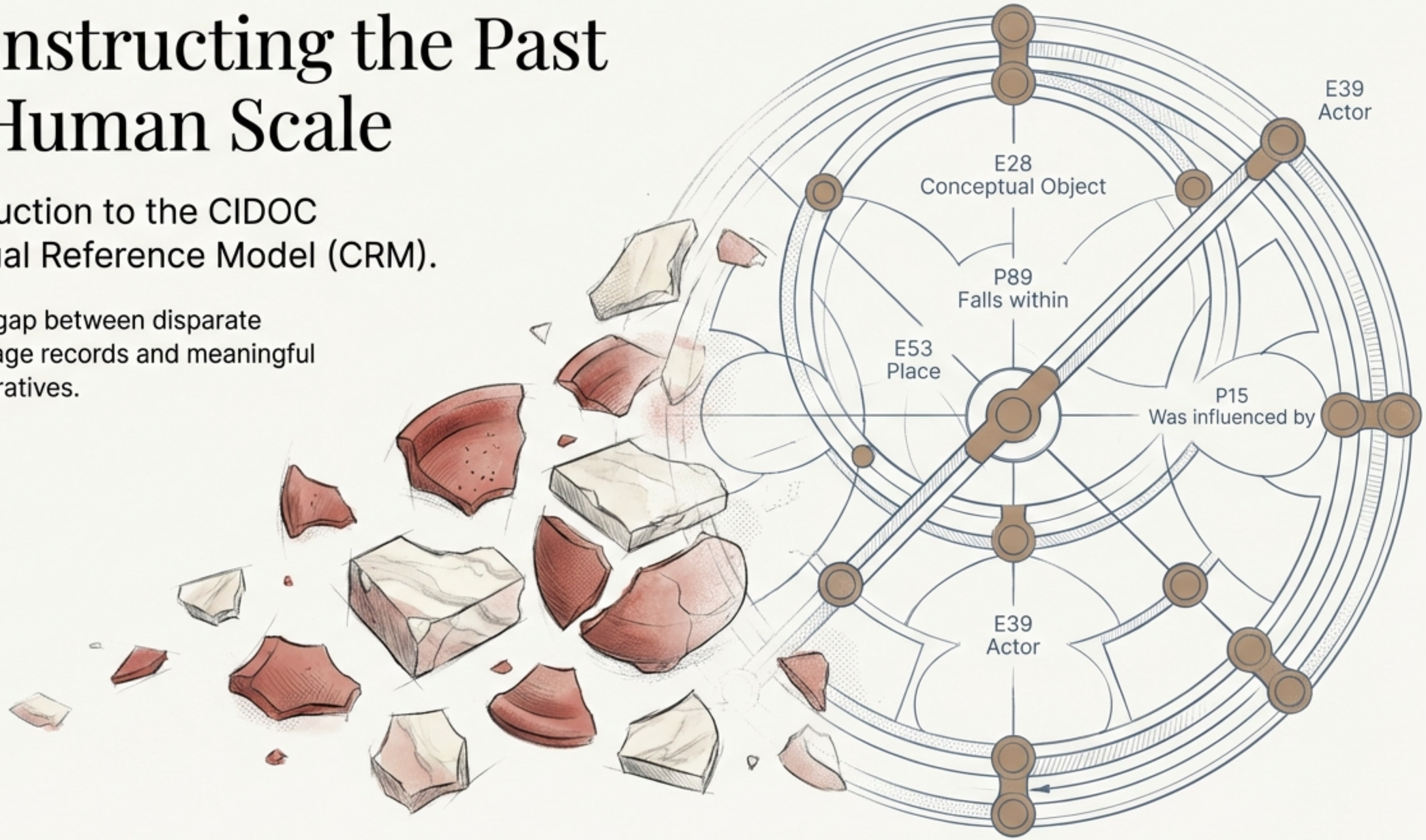
Reconstructing the Past at a Human Scale

An introduction to the CIDOC Conceptual Reference Model (CRM).

Bridging the gap between disparate cultural heritage records and meaningful historical narratives.



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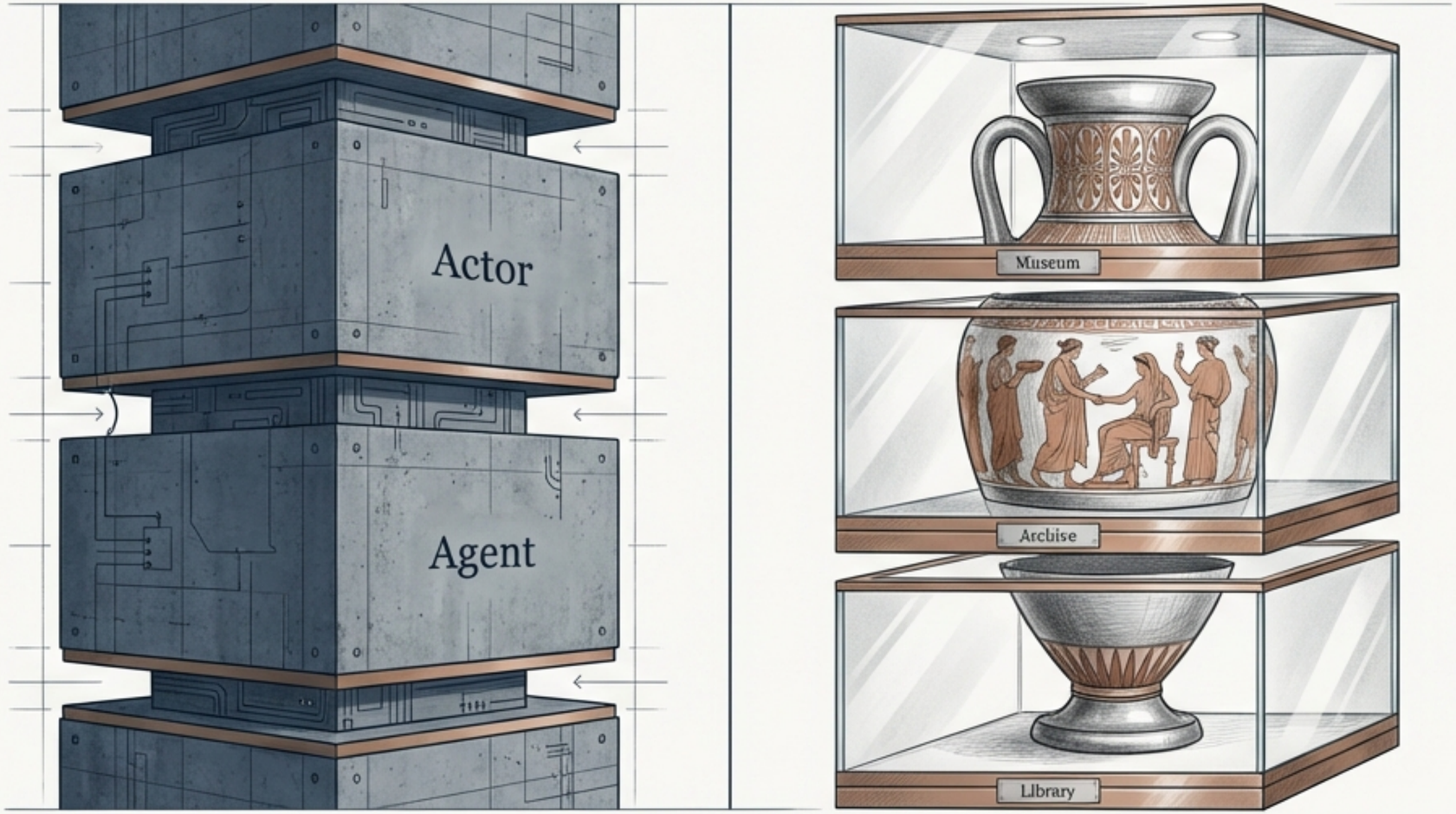
Cultural Heritage Data is Trapped in Silos

Syntactic interoperability only allows systems to exchange data without errors.
It does not mean the systems actually understand the meaning of that data.

Historical documentation is inherently contextual, yet it is currently dispersed across independent, rigid datasets.



We possess the factual evidence of human history, but we lack the shared language to connect these isolated facts into global knowledge.

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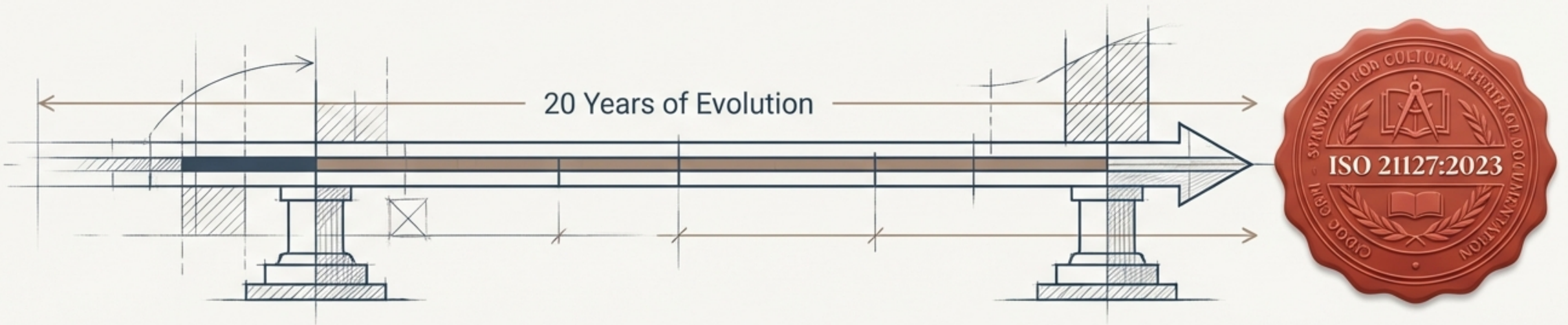
Supplying the Semantic Glue

The CIDOC Conceptual Reference Model (CRM) is a **formal ontology** designed for the cultural heritage domain. It operates as a theoretical and practical **tool for information integration.**

Instead of replacing local database **structures, it defines the underlying semantics** of those **structures**. It provides the **seman-santic glue** needed to mediate between published sources from museums, libraries, and archives without loss of scholarly meaning.



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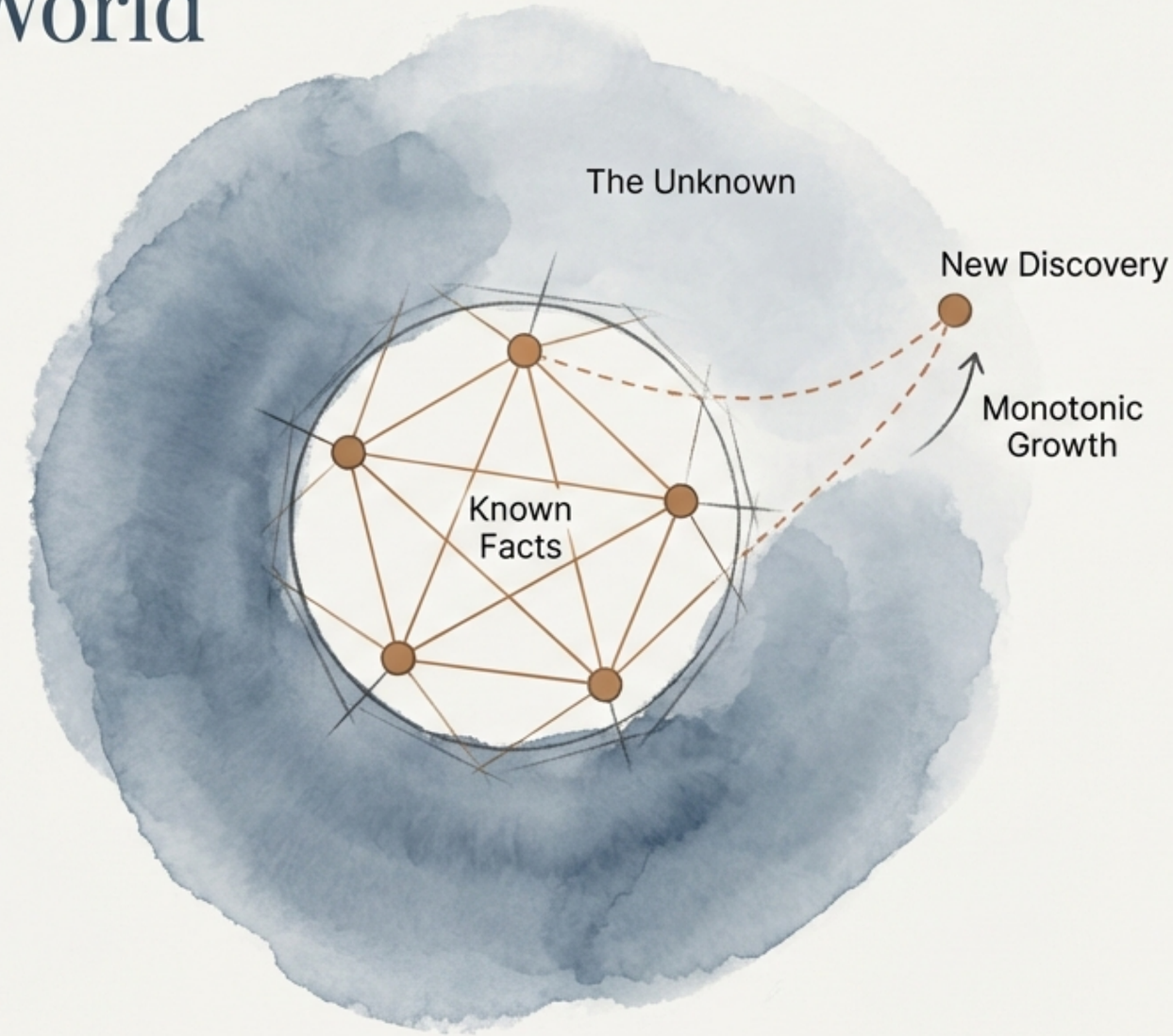
Designing for an Open World

Our records of the past are necessarily incomplete.

The CIDOC CRM embraces the Open World Assumption: the absence of a property in the system does not mean the item lacks that property in reality.

Monotonicity: As experts enter newly discovered, correct statements, the system never invalidates prior conclusions. Data structures grow and accumulate alternative opinions without conflict.



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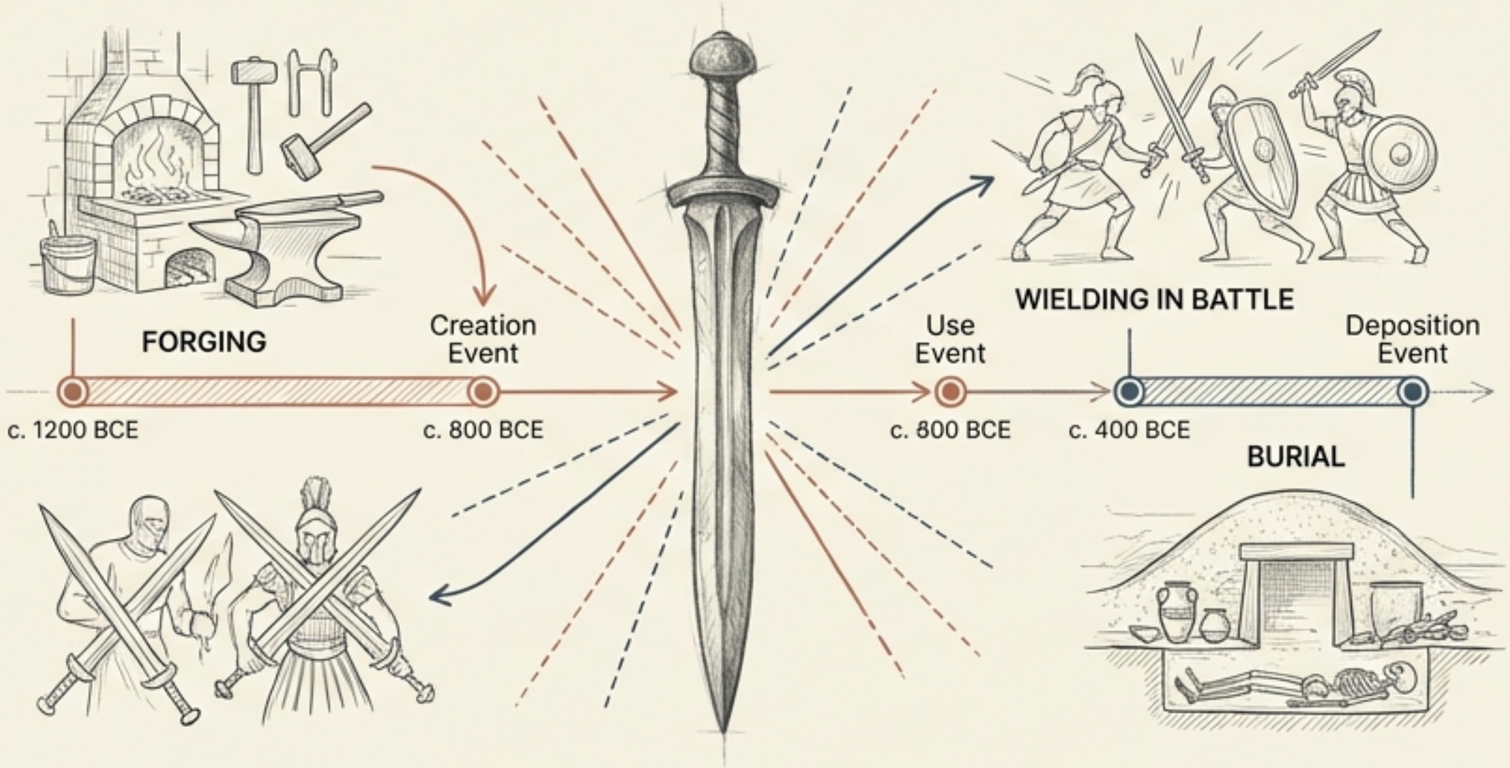
Shifting from Static Records to Dynamic Histories

Traditional databases document objects as static entities with fixed attributes. Historical reality is driven by actions, interactions, and transformations. The CIDOC CRM models history through **Events**. We shift the focus from describing an object's current state to documenting the actual historical occurrences that shaped it, moved it, and brought it to us.

What is this?

What happened to this object?



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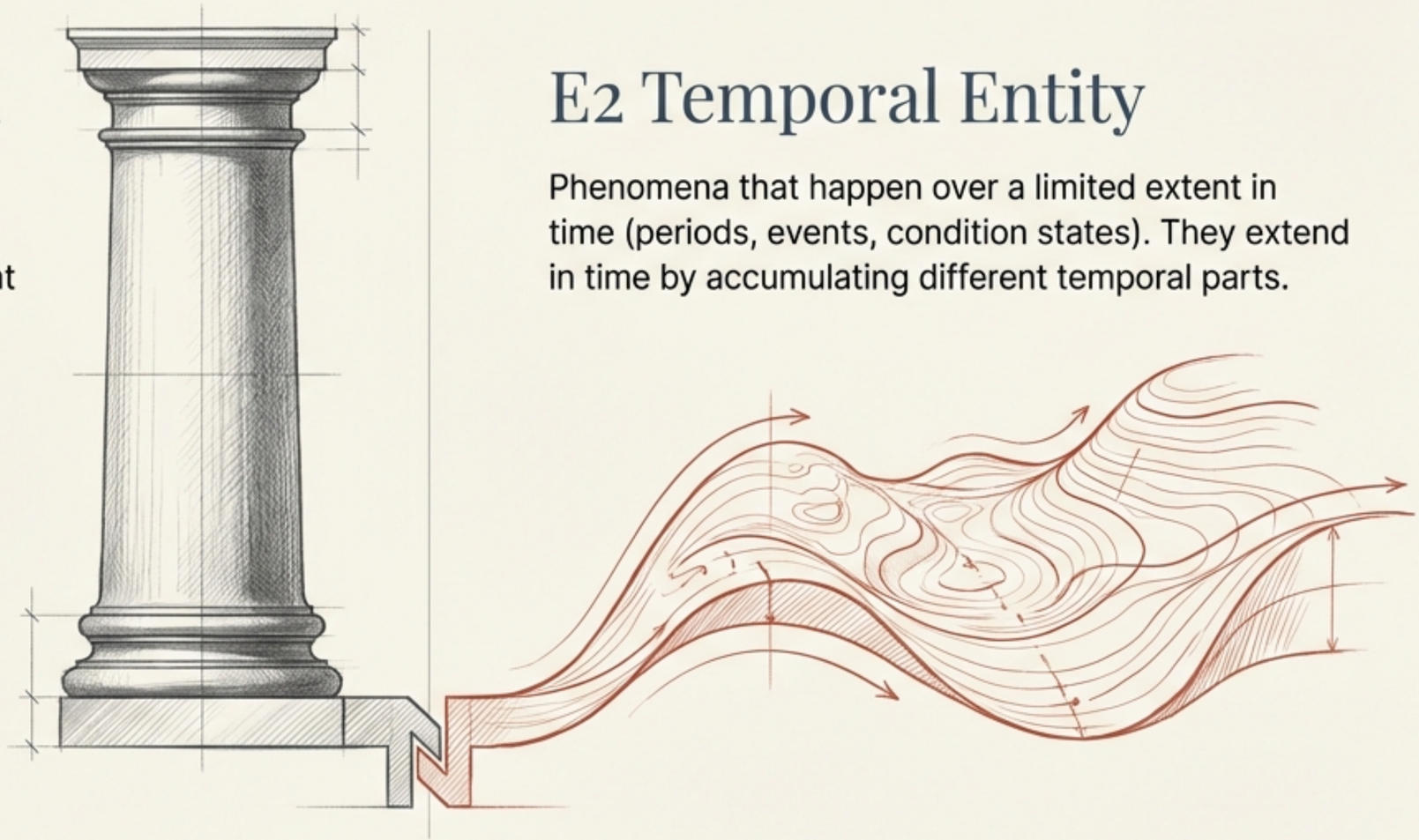
The Fundamental Architecture of Reality

E77 Persistent Item

Things that maintain a recognizable identity over time (people, physical objects, ideas). They are wholly present at any time they exist.



E2 Temporal Entity

Phenomena that happen over a limited extent in time (periods, events, condition states). They extend in time by accumulating different temporal parts.

The CRM weaves these two realities together to reconstruct the past.

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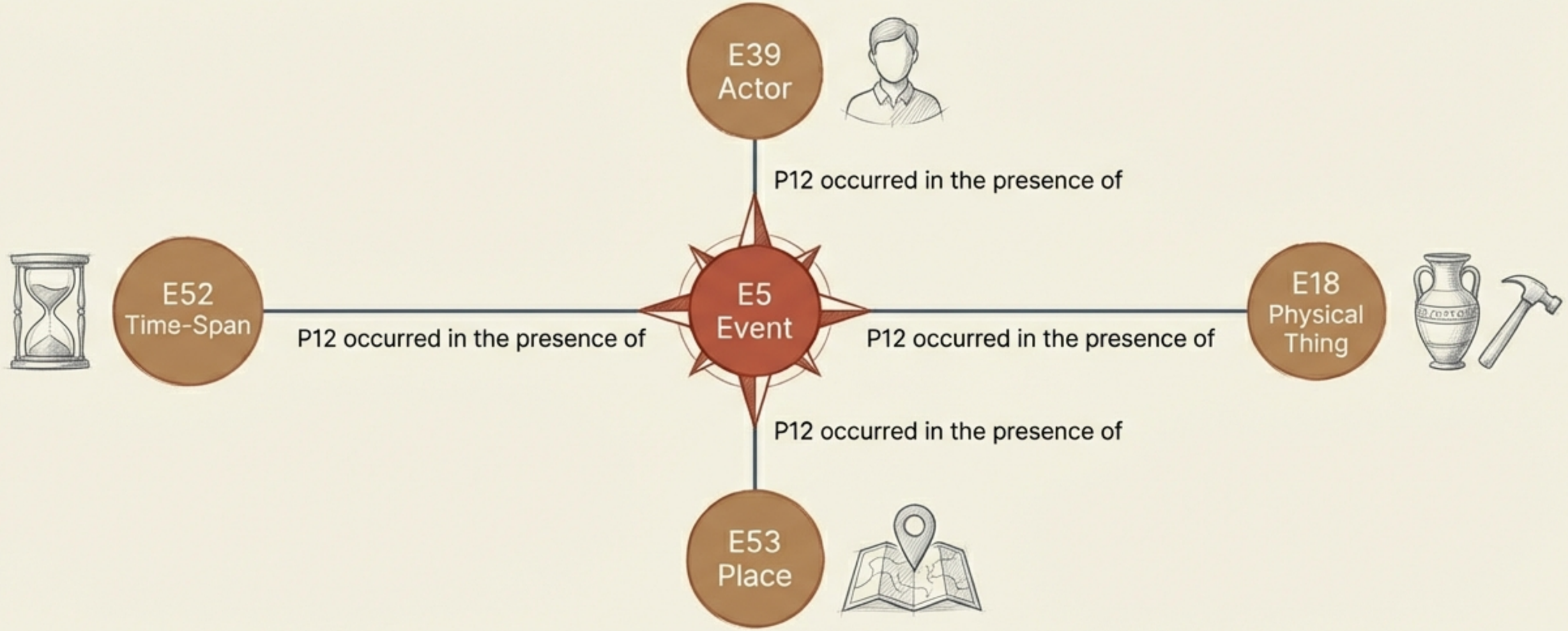
Events as the Nexus of History of History

An E5 Event is a distinct, delimited process of a material nature. Events act as the gathering points in the network. They constrain the existence of involved things to a specific place within a specific time. This structure natively answers the Who, When, Where, What, and How of any historical query.



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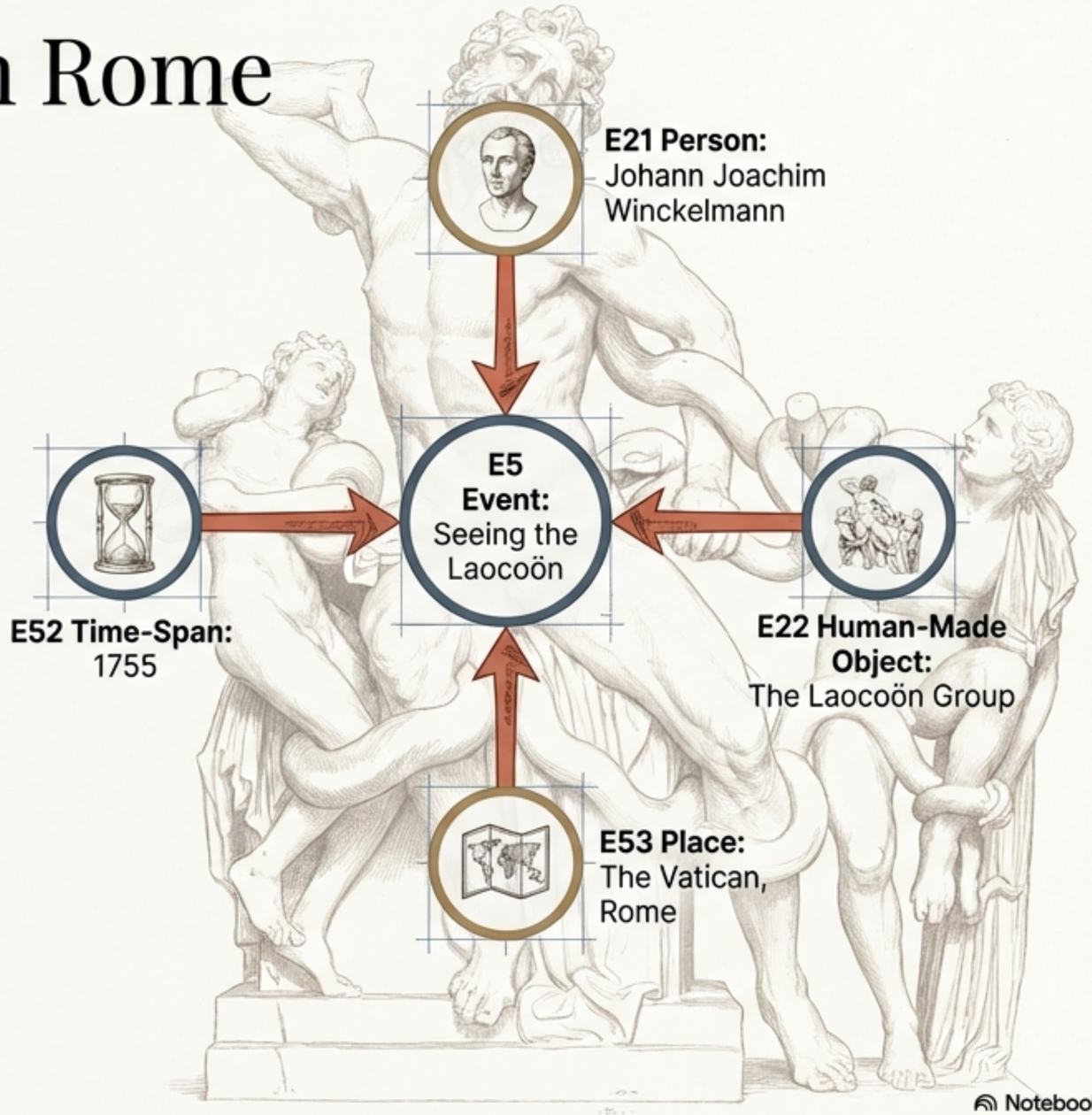
Case Study: A Moment in Rome

We can perfectly encode the exact historical moment the German scholar Johann Joachim Winckelmann observed the Laocoön sculpture. This single event node binds the actor, the object, the location, and the time.

By tracking this event, we can trace the transfer of information from a Greek original, to a Roman copy, to the mind of a scholar, and eventually into his 1764 writings (E73 Information Object).



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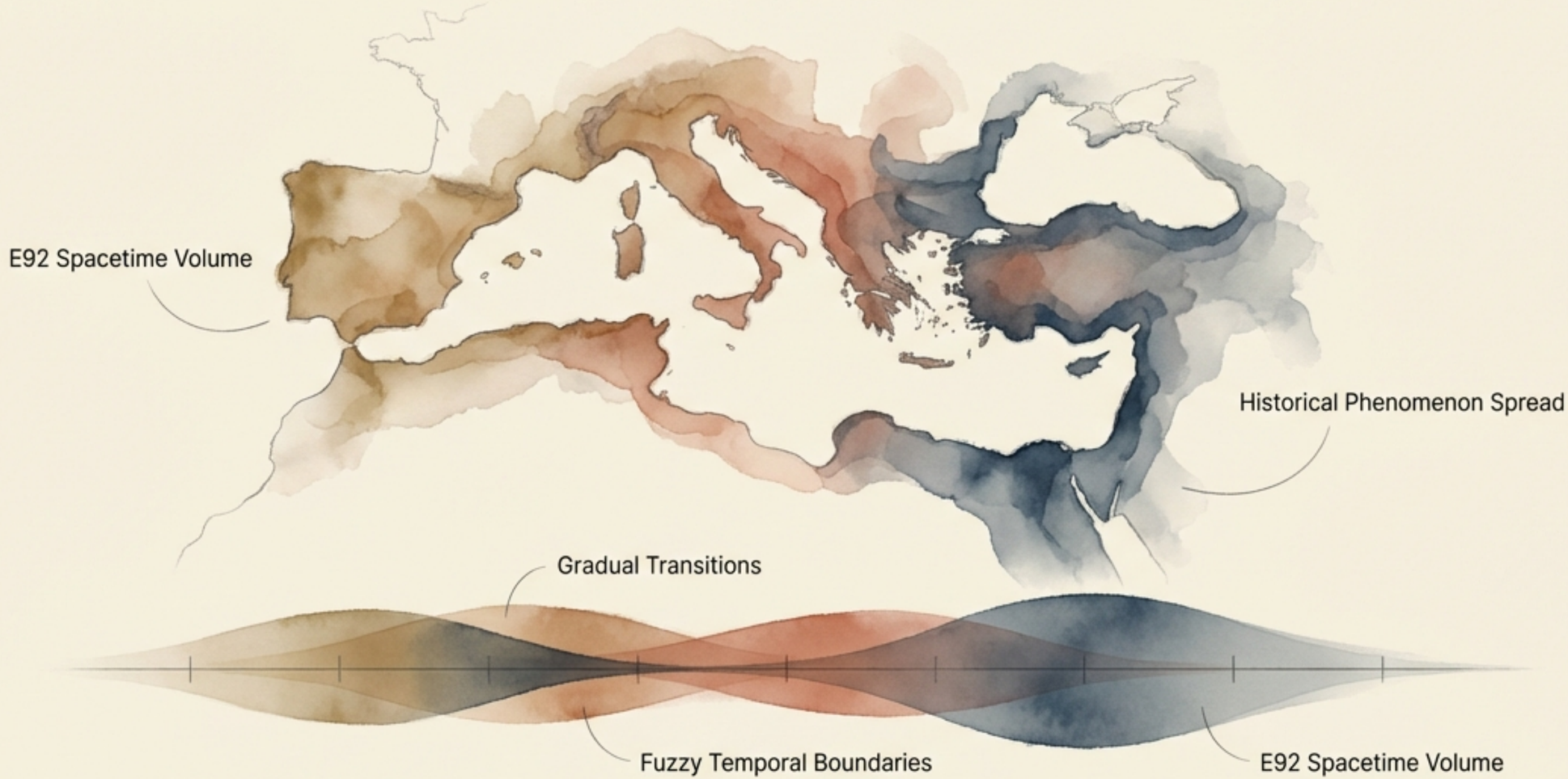
Navigating Fuzzy Space and Time

Historical boundaries are rarely exact. Phenomena spread out over time and space with gradual transitions. The CRM utilizes E92 Spacetime Volume to document geometric extents that vary over time. Instead of forcing imprecise history into rigid start and end dates, the CRM uses temporal relation primitives based on fuzzy boundaries. This enables accurate topological and mereological reasoning even when precise coordinates or absolute dates are unknown.



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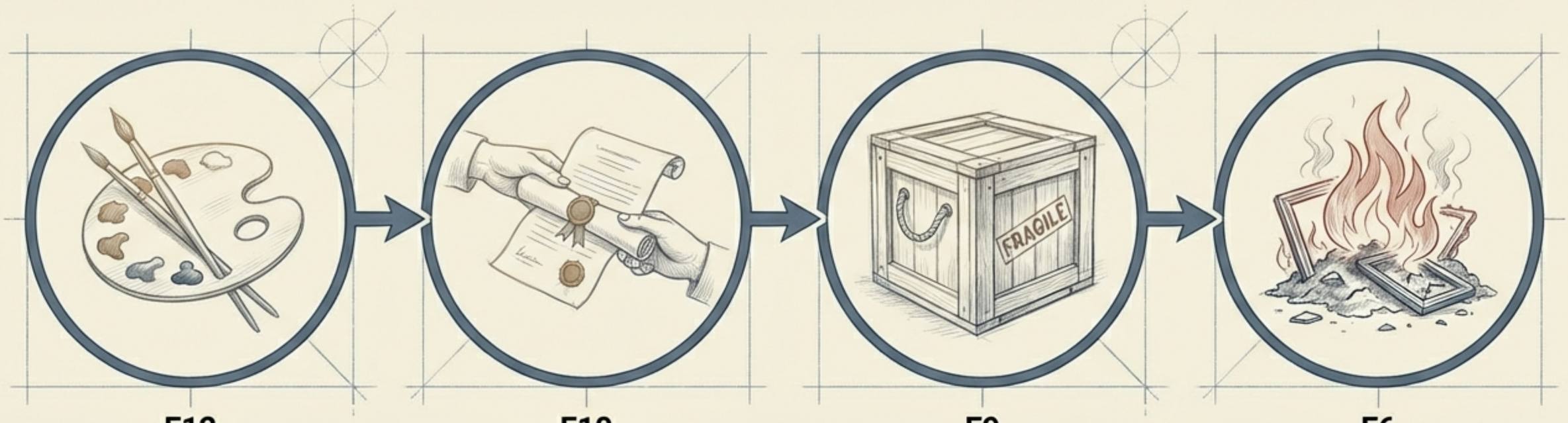
Tracking the Lifecycle of Things

The identity of an E18 Physical Thing is bound to the relative stability of its material form. The CRM tracks its entire trajectory through specific, causal events rather than overwriting its current status in a database row. This creates a permanent, monotonic ledger of every intervention, ownership change, and location shift an object experiences.



E12
Production

E10
Transfer of Custody

E9
Move

E6
Destruction

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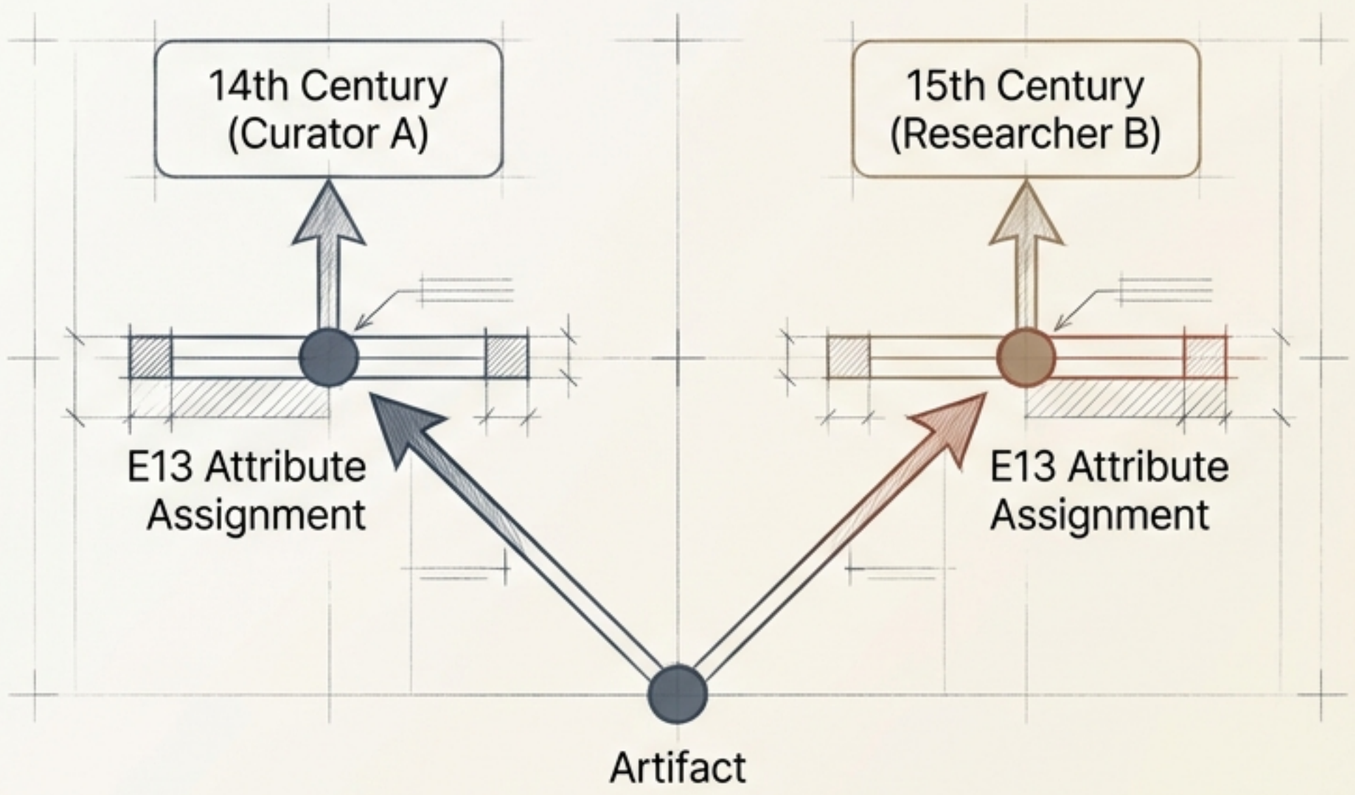
Encoding Authorship and Authority

Every statement in a knowledge base is an assertion made by a human agent. The CRM handles conflicting scholarly opinions seamlessly through the E13 Attribute Assignment class. We track who made a statement, when they made it, and how they arrived at that conclusion. Integrated knowledge becomes a research tool for accumulating alternative opinions, preserving rigorous scholarly transparency.



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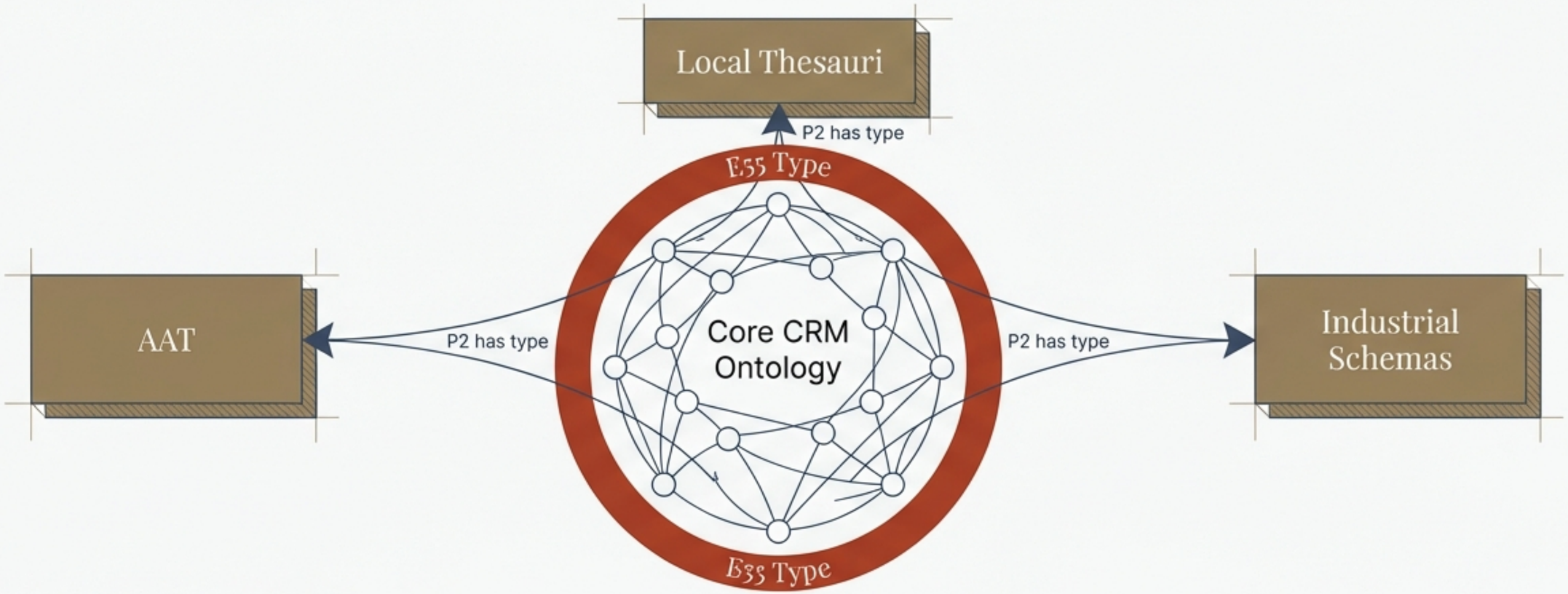
Interfacing with Existing Vocabularies

The CRM does not define local terminology. It relies on external classification schemas and thesauri. E55 Type serves as the universal interface to these external vocabularies. Using the P2 has type property, institutions can refine the classification of CRM instances to any level of detail. This ensures the core ontology remains minimal while accommodating endless specialized categorization.



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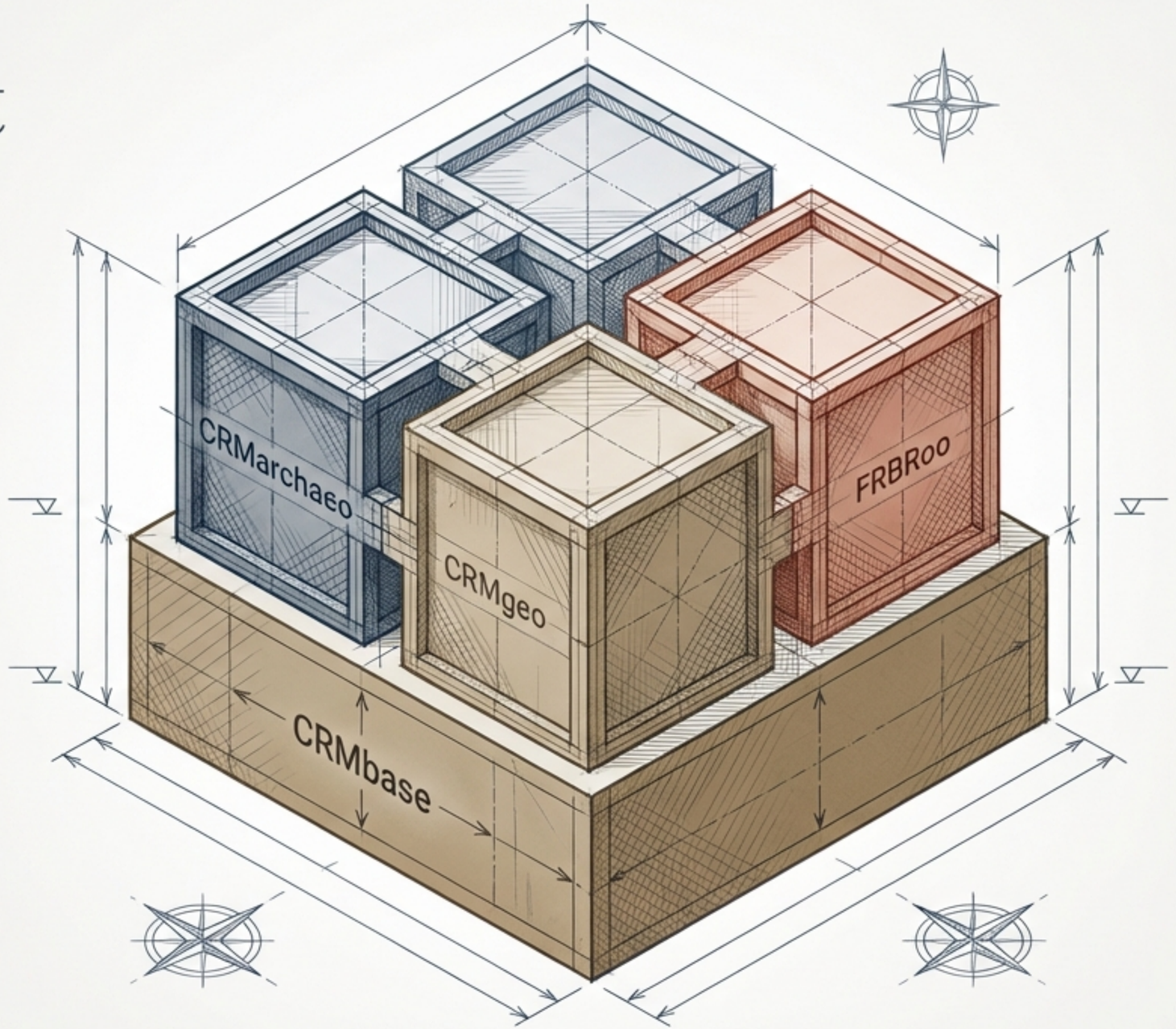
A Foundation Built for Extension

The intended scope of the CRM is infinite. The model is built to be extended through compatible type hierarchies. Extensions are developed in partnership with specialized research communities.

Query Containment: Data expressed in any specialized extension remains fundamentally compatible with CRMbase concepts and relations. This conservative extension strategy guarantees long-term information integrity.



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A Living Standard Driven by Material Evidence

The CIDOC CRM is not an isolated academic exercise. It is a bottom-up standard driven by the actual, well-understood practices of domain experts.

Maintained by the CIDOC CRM Special Interesl Interest Group (SIG) under the aegis of the International Council of Museums (ICOM). A volunteer community of private and public institutions constantly evolving the standard based on encounters with new, real-world material evidence.

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One Language for Our Shared History

The CIDOC CRM transforms disparate, localized data into a coherent global resource. It provides the rigorous semantic definitions required for automatic data transformation, complex associative queries, and true semantic interoperability.

By adopting this standard, cultural institutions can finally unlock the full, interconnected story of human heritage for scholarly interpretation and public discovery.

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